



THE COMMONWEALTH OF MASSACHUSETTS

WATER RESOURCES COMMISSION

North Reading Interbasin Transfer Application WRC Staff Recommendation

I. Background

On May 11, 1990, the Town of North Reading submitted an application for an increase over the present rate of interbasin transfer. North Reading is proposing to construct a new 12-inch diameter water main in order to purchase additional water from the Town of Andover, which derives its water supply entirely from the Merrimack River basin. The proposed water main will be used in addition to the existing 8-inch water main and will increase the ability of North Reading to transfer water by an additional 1.0 mgd. The water will ultimately be discharged to the Ipswich River basin through on-site septic systems. This application will be judged on this 1.0 mgd alone. The original 0.5 mgd transfer has been in place since 1958, and thus is "grandfathered".

North Reading is projecting water supply deficits of greater than 1.0 mgd by the year 2015, without additional supplies. The Ipswich River Basin Plan, prepared by the Department of Environmental Management (DEM), recommended that the town reactivate the Stickney Well, closed due to volatile organic chemical contamination in 1978, and purchase additional water from Andover in order to meet projected demands.

The Department of Environmental Protection (DEP) has concluded that the Stickney Well is not a viable water supply option at this time. The well has extensive contamination, which will require a permanent treatment plant. This is not economically feasible for the Town unless the costs are able to be recovered from the responsible party through legal action. Even if the well becomes economically viable, it is questionable if it would be environmentally viable under the Water Management Act, as the Ipswich River basin has been identified as a deficit basin in terms of water resource availability, by DEM and the USGS.

On September 10, 1990, after receiving additional information from North Reading, the Water Resources Commission voted that the application was complete. Public hearings were held in North Reading and Andover on October 30, 1990. Public comment was accepted until November 6, 1990.

II. Evaluation of the Proposed Interbasin Transfer

1. This interbasin transfer application was reviewed on its own merits.
2. The staff recommendation is made on facts relevant to the Interbasin Transfer Act and its regulations. Other factors, such as economic hardship, are not pertinent.
3. The staff used guidelines and interpretations which have been in effect for more than 5 years.

III. Recommendation

On December 10, 1990, the Water Resources Commission will discuss the merits of an application submitted by the Town of North Reading, in the Ipswich River basin, to increase its present rate of interbasin transfer through the purchase additional water from the Town of Andover, in the Merrimack River basin.

North Reading meets all of the six applicable criteria required under the Interbasin Transfer Act (Chapter 658, Acts of 1983) provided certain water conservation conditions are met. Because the Town has demonstrated a commitment to meet these conditions, staff for the Water Resources Commission recommends a conditional approval of this application.

IV. Synopsis of Evaluation of Criteria

CRITERION	PROPOSED IBT MEETS CRITERION?
o Criterion 1: MEPA Compliance	Yes
o Criterion 2: Viable Sources	Yes
o Criterion 3: Conservation	Yes, with conditions
o Criterion 4: Watershed Management	Does not apply
o Criterion 5: Reasonable Instream Flow	Yes
o Criterion 6: Ground Water	Does not apply

o Criterion 7: Local Water
Resources Plan

Yes

o Criterion 8: Other Transfers

Yes

V. Basis for WRC's Staff Recommendation of Conditional Approval

North Reading has made great efforts in the area of water conservation and source protection. These efforts include:

- o The Town is 100% metered, with 92% of all billings from actual meter readings.
- o The rate structure was recently changed to an increasing block rate; the minimum use charge was eliminated.
- o All Water Department revenues are placed in a dedicated account and used to cover operating and maintenance expenses.
- o The Town instituted mandatory water restrictions in the Summer of 1990. There are restrictions on the use of Town water for lawn watering in all new commercial and high density residential developments. Existing facilities and one- and two-family homes are being encouraged to install wells for outside water use.
- o The Town has enforcement powers to levy fines under its DEP-approved drought contingency plan.
- o Critical aquifer recharge areas have been identified and protected through aquifer protection zoning by-laws, wetland and floodplain overlay districts, and direct purchase. Limited use is allowed in these areas and the zoning regulations are strictly enforced.
- o The Town's unaccounted-for water is 12%.

In addition to these actions, North Reading must complete certain additional actions to fully comply with Criterion #3: All practical measures to conserve water have been taken in the receiving area. Specifically:

- o North Reading must complete its scheduled leak detection survey.
- o North Reading must establish a program of meter replacement or repair. At the present time, meters are serviced only if a customer complains of erroneous readings.
- o All public buildings need to be retrofit with water saving devices.
- o A program to provide residential retrofit devices was instituted in 1984, but was not successful. A more effective residential retrofit program must be instituted.

Throughout the application process, Town officials have expressed a willingness to respond to the above mentioned deficiencies. Their application for a leak detection grant was awarded by DEP in August 1990. A second system-wide leak detection survey is scheduled to begin in Spring 1991, to be completed in December 1991. The Town's goal is to begin to replace all existing residential meters with externally-read meters in FY 1991. The Town also is proposing to readvertise the availability of residential retrofit devices, giving them away free of charge.

Therefore Staff recommends that approval of this interbasin transfer application be conditional upon the completion of the following points:

- o Provide evidence that the proposed leak detection survey has been completed and that all leaks have been repaired. Provide evidence that additional surveys of the entire system will be conducted every 4-5 years as planned.
- o Institute a formal meter replacement/repair program. Provide a schedule of the work to be completed and evidence of the Town's ability to conduct this work.
- o Retrofit the police and fire department buildings with water saving devices. Consult with MWRA to determine the type of residential retrofit program that will be most effective for North Reading and implement this program.

VI. Reasonable Streamflow

It is the judgement of the staff that this transfer will not have a significant effect on the instream flow of the Merrimack River and that reasonable instream flows will be maintained. On the lowest flow day of the drought of record, a transfer of the maximum proposed amount (1.0 mgd) would only result in a 0.70% (less than one percent) decrease in streamflow. (See Table). Additionally, Andover's withdrawals are governed by the flow releases required under the Lawrence Hydroelectric Associates FERC license. This requires that 615 mgd (951 cfs) be released from the dam directly downstream of Andover's intake. The Town of Andover does not withdraw water from the Merrimack when it approaches this level.

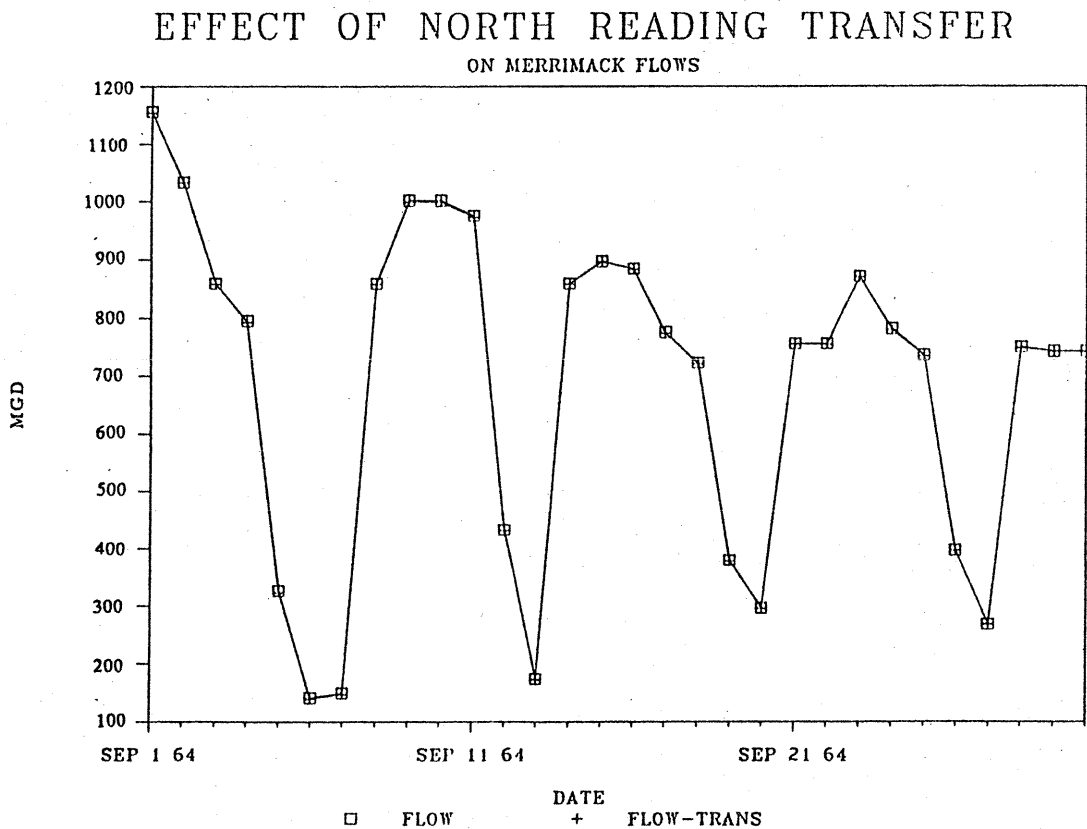
When the basin plan for the Merrimack River basin is formulated, a minimum streamflow threshold which takes all water uses into account will be developed. This will occur in 1995.

MERRIMACK RIVER
WITHDRAWAL AS PERCENT OF FLOW

PERIOD OF TRANSFER	MGD	MAXIMUM INCREASE (1.0 MGD)	AVERAGE INCREASE (0.10 MGD)
AVERAGE FLOW	3,421	0.03%	<0.01%
MAY	7,536	0.01%	<0.01%
JUNE	3,785	0.03%	<0.01%
JULY	2,112	0.05%	<0.01%
AUGUST	1,714	0.06%	<0.01%
SEPTEMBER	1,960	0.05%	<0.01%

HIGHEST PERCENT TRANSFER ON A GIVEN DAY FOR THE
PERIOD OF RECORD (SEPT 6, 1964): 142 MGD 0.70%

PROPOSED HYDRAULIC CAPACITY OF THE NEW PIPE FROM ANDOVER: 1.0 MGD
AVERAGE TRANSFER: 0.10 MGD
MAXIMUM TRANSFER: 1.5 MGD (ASSUMES EXISTING 0.5 MGD TRANSFER
+ 1.0 MGD INCREASE)



The volume to be transferred is too small to be depicted on a graph of this scale.

INTERBASIN TRANSFER ACT
CRITERIA FOR EVALUATING AN APPLICATION
APPLICATION BY THE TOWN OF NORTH READING TO TRANSFER WATER FROM THE TOWN OF ANDOVER

CRITERION #1 An environmental review pursuant to MGL, c.30, ss 61 and 62H, inclusive has been compiled with for the proposed IBT.

On January 11, 1990 the Town of North Reading, through its consultant, CDM, contacted the MEPA unit to determine what requirements under the Massachusetts Environmental Policy Act would need to be satisfied before this project could be carried out. The MEPA unit determined, in a letter dated February 12, 1990, that MEPA compliance is not required for this project.

CRITERION #2 All reasonable efforts have been made to identify and develop all viable sources in the receiving area of the proposed interbasin transfer.

The Town has investigated the following in-basin sources:

Reactivation of the Stickney Well: This well was closed in December 1978 due to the presence of volatile organic compounds in excess of drinking water standards. The well's estimated dependable yield was 0.54 mgd. According to DEP, this is not a viable source at this time. Potentially responsible parties have been identified and cost recovery procedures are underway. However, the well has been damaged through vandalism and Iron and Manganese clogging. The well will need to be replaced. It could only be operated at reduced capacity. Any reactivation of this well would be subject to the Water Management Act. A careful evaluation of its pumping effects on nearby Reading Wells and the entire Ipswich basin would have to be completed before it could come back on line.

Installation of additional wells in sand and gravel aquifers: The Town has explored for water extensively within its borders. Approximately 200 test wells have been drilled, without result. The USGS has determined that the existing water supply development is in excess of safe yield (USGS Water Supply Paper No. 1694).

Installation of bedrock wells: Through the limited work in the field of bedrock well development in North Reading, it has been determined that such wells would provide only very low yield. Additionally, DEP will not approve bedrock wells for municipal water supply if other options exist. Therefore this option has not been actively pursued.

Criteria
Page 2.

Surface water development at Mill Meadow: A reservoir at this site was studied in the 1960's. This reservoir would have been filled by pumping Ipswich River water. For this project to be completed today, the wetlands at Mill Meadow would have to be flooded. It also would cause additional stress to the already stressed Ipswich River, and might not be permitted under the Water Management Act. The project, if able to overcome these environmental problems, would be quite expensive (\$10-\$15 million 1993 dollars) and have a low cost/benefit ratio.

Purchase of water from neighboring communities in-basin: As stated in the WRC-approved Ipswich River Basin plan, the communities within the Ipswich River basin are stressed, with many facing potential water shortages. Others have supplies that are only marginally adequate for their needs.

CRITERION #3 All practical measures to conserve water have been taken in the receiving area, including but not limited to the following:

CONSERVATION MEASURE

Leak Detection

DEP/MWRA RECOMMENDATIONS

Entire system surveyed every two years.

NORTH READING ACCOMPLISHMENTS

Received confirmation of leak detection award from DEP in August 1990. Will begin second system-wide leak detection survey in Spring 1991, to be completed by December 1991. Last leak detection survey was completed in 1983. Minimal leaks were found and fixed, saving the Town approximately 0.02 mgd. The Town plans to conduct a leak detection study every 4-5 years with the frequency adjusted based on the annual computation of unaccounted -for water. Currently the Town's unaccounted-for water is 12%.

Metering

100% of system metered. Test all meters over 10 years old.

Quarterly meter readings.

100% of system metered. 92% of all billings are based on actual readings; 8% are estimated. No formal program of meter replacement and repair. The Town's goal is to begin converting all existing residential meters with externally read meters in FY 1991. Residential meters are read twice a year.

Rate Structure which reflects and encourages conservation.

Full cost / No decreasing block rate.

Increasing block rate; true cost pricing, informal Enterprise Account, covers all costs related to operating, maintaining and improving the water supply system. Recent (Spring 1988) pricing change to eliminate the minimum use charge.

Public Information Program

Bill stuffers.

Advertises conservation measures in newspaper. Annual voluntary water restrictions up until Summer 1990, when they became mandatory. Restriction on the use of Town water for lawn watering in new commercial and high density residential developments. The Town has been encouraging existing facilities and single family homes to install their own wells for outside water use.

Drought Contingency Plan

Completed contingency plan under DEP WMA regulations. The Town has enforcement powers, including the power to levy fines.

Implement land use controls
for sources in the receiving
area that meet the requirements
DEP regulations 310 CMR 22.20.

Have identified and protected
critical aquifer recharge areas
through aquifer protection zoning
by-laws, wetland and floodplain
overlay districts, and direct
purchase. Allow limited use and
strictly enforce the zoning
regulations.

Plumbing fixtures

Enforce state plumbing code/
retrofit public buildings with
water saving devices / make
retrofit devices available at
cost if residential GRCD is
over 80.

State plumbing code is enforced.
All public buildings, but the police
and fire department buildings, have
been retrofit with water saving
devices. Residential GRCD is 72;
retrofit devices were made available
to residential customers in 1984;
program was not successful. The
Town is proposing to readvertise the
availability of these devices and
give them away free of charge.

CRITERION #4 Forestry management program: not applicable to this project.

CRITERION #5 Reasonable instream flow in the river from which the water is transferred is maintained.

A preliminary minimum streamflow is being developed by OWR. It will be refined during the River Basin planning process. North Reading also has an agreement with Lawrence Hydroelectric Associates (LHA) which states that the Town will compensate LHA (\$10/million gallons) for all withdrawals made when the river's flows are less than 12,000 cfs.

CRITERION #6 Ground water criterion; not applicable to this project.

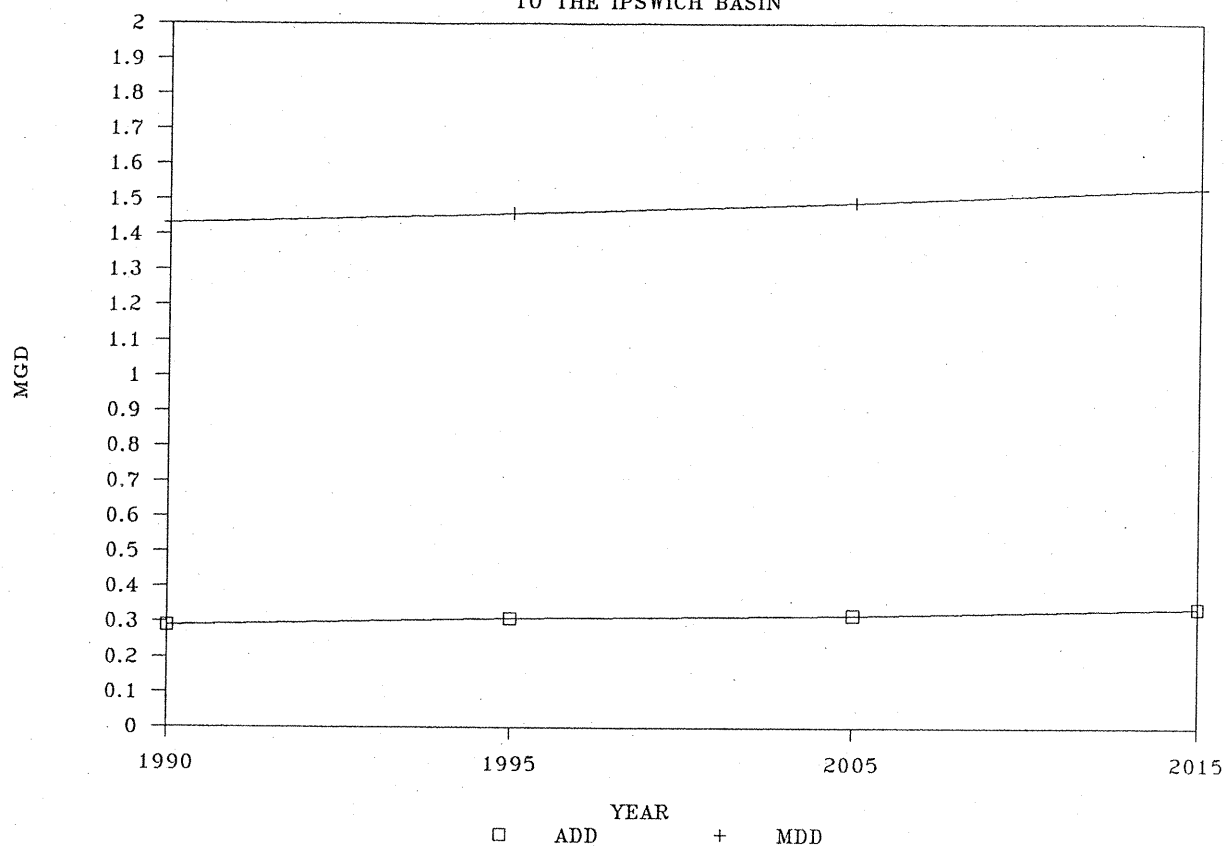
CRITERION #7 Communities have adopted or are actively engaged in developing a local water resources management plan.

North Reading has completed both a Municipal Water Supply questionnaire and a conservation plan. Additionally, DEM has completed a river basin plan for the Ipswich River basin, the receiving basin.

CRITERION #8 The Commission shall consider the impacts of all past, authorized or proposed transfers in the donor basin.

The Water Resources Commission recognizes the need for cooperation with the State of New Hampshire on all matters affecting the quality and quantity of the Merrimack River. The EPA's Merrimack River Initiative, is a good first step at coordinating interstate issues. Through the Initiative and the river basin planning program, we will continue to work closely with New Hampshire. The State of Massachusetts takes upstream transfers into account through readings at the USGS gage on the Merrimack River below the Concord River, the first gage downstream from the New Hampshire/Massachusetts border. At the present time, no other proposals for interbasin transfers are known to the Commission.

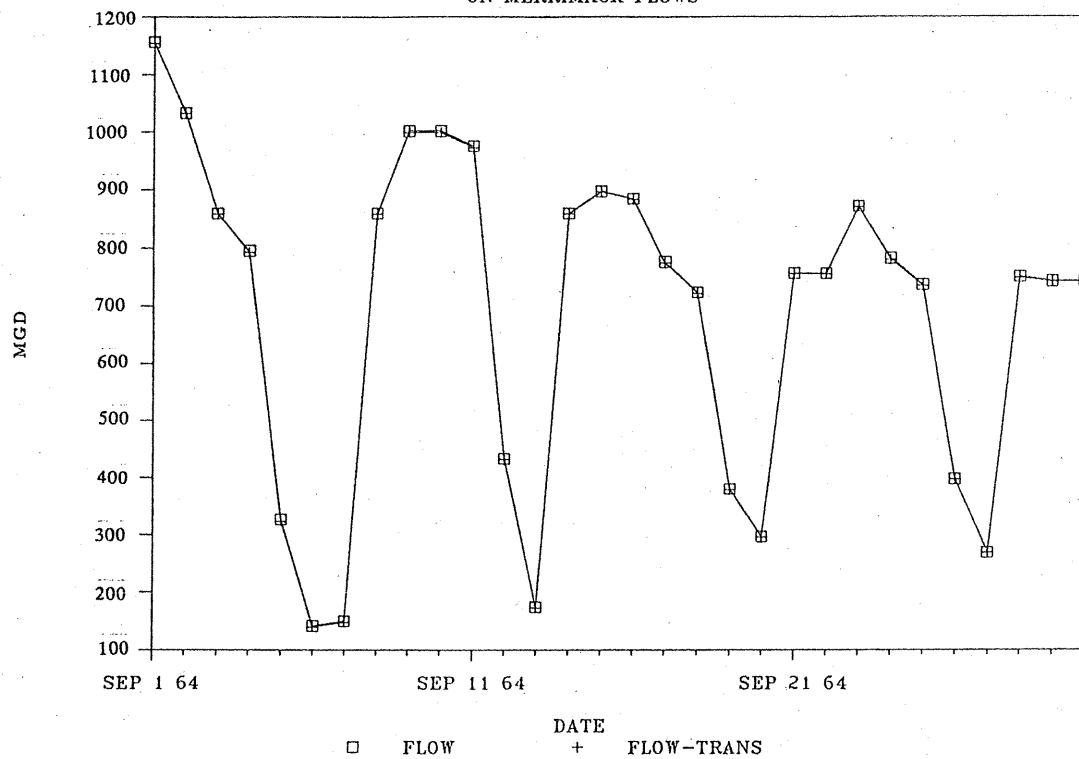
TRANSFERS FROM THE MERRIMACK BASIN TO THE IPSWICH BASIN



CONCERNS RAISED THROUGH PUBLIC AND AGENCY COMMENT
REGARDING THE NORTH READING/MERRIMACK RIVER
INTERBASIN TRANSFER APPLICATION

- o That North Reading will close its existing wells. This issue is addressed in the November 6, 1990 letter from CDM.
- o North Reading's conservation plan is not adequate or in place. Additional information on North Reading's conservation program has been received (November 6th CDM letter).
- o North Reading would sell water to Ipswich basin neighbors during emergencies.
- o Lack of Merrimack River basin plan and Water Management Act permitting.
- o Can the intake be retrofitted in the future if necessary to address entrainment concerns? (Fisheries restoration program) Can it be done now?
- o Currently, North Reading's wells often clog with Iron and Manganese when they are used at full capacity under stressed conditions.
- o Transferring water from the Merrimack to the Ipswich basin could improve conditions within the Ipswich River basin.
- o What are the prospects of the Stickney Well being reactivated and permitted under the Water Management Act?

EFFECT OF NORTH READING TRANSFER ON MERRIMACK FLOWS



The volume to be transferred is too small to be depicted on a graph of this scale.



THE COMMONWEALTH OF MASSACHUSETTS

WATER RESOURCES COMMISSION

North Reading Interbasin Transfer Application WRC Decision

I. Decision

On January 14, 1991, the Water Resources Commission voted on an application submitted by the Town of North Reading, in the Ipswich River basin, to increase its present rate of interbasin transfer through the purchase of up to an additional 1.0 mgd of water from the Town of Andover in the Merrimack River basin.

The WRC voted unanimously (8-0) to approve the application provided that the Town furnish proof that it has completed the conservation measures described herein, thus fully complying with the Interbasin Transfer Act (Chapter 658, Acts of 1983).

II. Background

On May 11, 1990, the town of North Reading submitted an application for an increase over the present rate of interbasin transfer. North Reading is proposing to construct a new 12-inch diameter water main in order to purchase additional water from the Town of Andover, which derives its water supply entirely from the Merrimack River basin. The proposed water main will be used in addition to the existing 8-inch water main and will increase the ability of North Reading to transfer water by an additional 1.0 mgd. The water will ultimately be discharged to the Ipswich River basin through on-site septic systems. The Town currently purchases up to 0.5 mgd. This transfer has been in place since 1958, and thus is "grandfathered".

North Reading is projecting water supply deficits of greater than 1.0 mgd by the year 2015, without additional supplies. The Ipswich River Basin Plan, prepared by the Department of Environmental Management (DEM), recommended that the town reactivate the Stickney Well, closed due to volatile organic chemical contamination in 1978, and purchase additional water from Andover in order to meet projected demands.

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On September 10, 1990, after receiving additional information from North Reading, the Water Resources Commission voted that the application was complete. Public hearings were held in North Reading and Andover on October 30, 1990. Public comment was accepted until November 6, 1990.

III. Evaluation of the Proposed Interbasin Transfer

1. This interbasin transfer application was reviewed on its own merits.
2. The decision was made on facts relevant to the Interbasin Transfer Act and its regulations. Other factors, such as water need or economic hardship, are not pertinent.
3. The WRC used guidelines and interpretations which have been in effect for more than 5 years.

IV. Synopsis of Evaluation of Criteria

CRITERION	PROPOSED IBT MEETS CRITERION?
o Criterion 1: MEPA Compliance	Yes
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o Criterion 5: Reasonable Instream Flow	Yes
o Criterion 6: Ground Water	Does not apply

- o Criterion 7: Local Water Resources Plan Yes
- o Criterion 8: Other Transfers Yes

V. Basis for WRC's Decision of Conditional Approval

North Reading meets all of the six applicable criteria required under the Interbasin Transfer Act (Chapter 658, Acts of 1983) provided certain water conservation conditions are met. North Reading has made great efforts in the area of water conservation and source protection. These efforts include:

- o The Town is 100% metered, with 92% of all billings from actual meter readings.
- o The rate structure was recently changed to an increasing block rate; the minimum use charge was eliminated.
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In addition to these actions, North Reading must complete certain additional actions to fully comply with Criterion #3: All practical measures to conserve water have been taken in the receiving area. Specifically:

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- o A program to provide residential retrofit devices was instituted in 1984, but was not successful. A more effective residential retrofit program must be instituted.

Throughout the application process, Town officials have expressed a willingness to respond to the above mentioned deficiencies. Their application for a leak detection grant was awarded by DEP in August 1990. A second system-wide leak detection survey is scheduled to begin in Spring 1991, to be completed in December 1991. The Town's goal is to begin to replace all existing residential meters with externally-read meters in FY 1991. On December 10, 1990, the Commission received verbal notice from the Town that all public buildings had been retrofit with water saving devices. The Town also is proposing to readvertise the availability of residential retrofit devices, giving them away free of charge.

Therefore approval of this interbasin transfer application is conditional upon the completion of the following points:

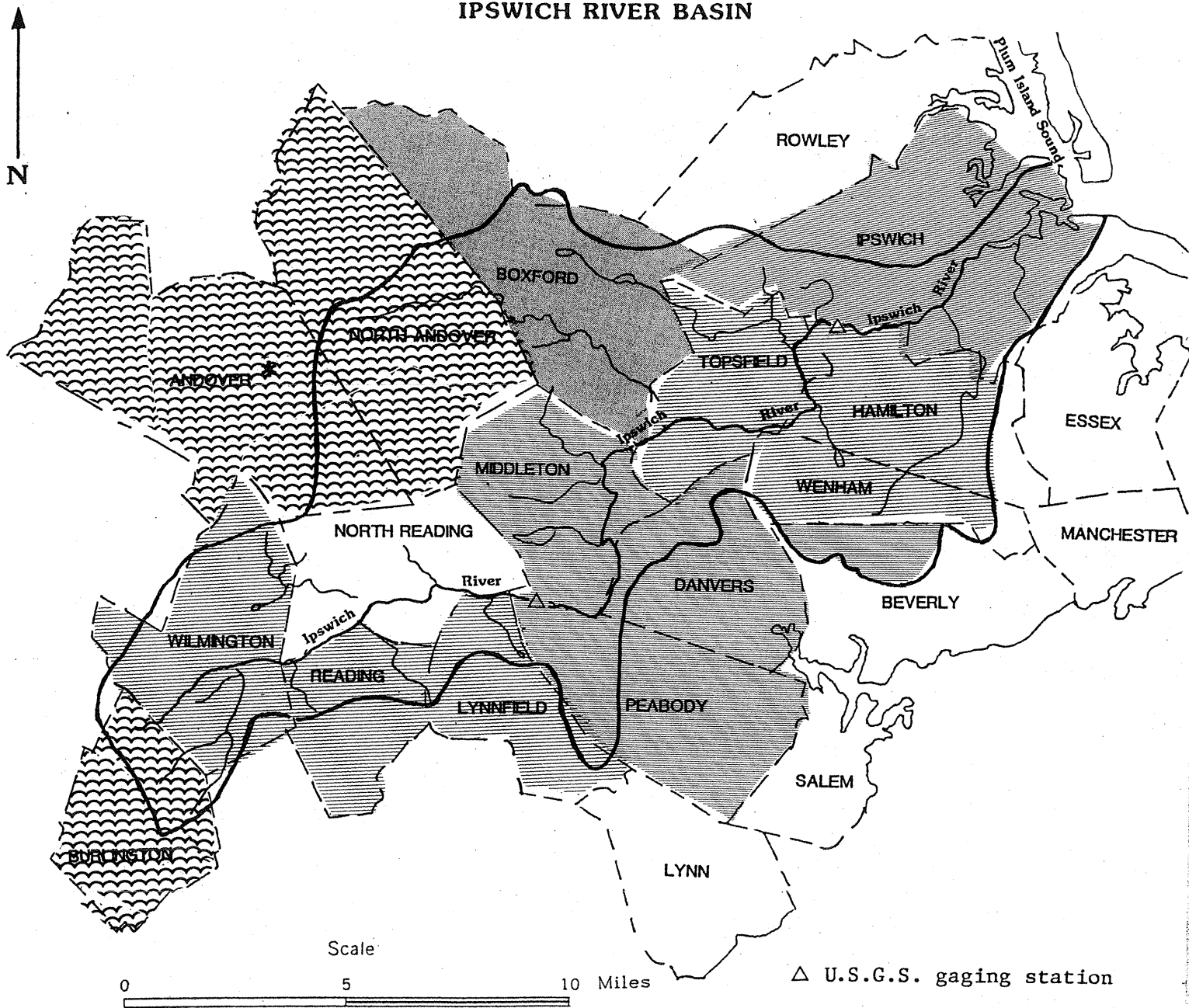
- o Provide evidence that the proposed leak detection survey has been completed and that all leaks have been repaired. Provide evidence that additional surveys of the entire system will be conducted every 4-5 years as planned.
- o Institute a formal meter replacement/repair program. Provide a schedule of the work to be completed and evidence of the Town's ability to conduct this work.
- o Provide documentation that the police and fire department buildings have been retrofit with water saving devices. Consult with MWRA to determine the type of residential retrofit program that will be most effective for North Reading and implement this program.

VI. Reasonable Instream Flow

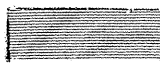
It is the judgement of the commission that this transfer will not have a significant effect on the instream flow of the Merrimack River and that reasonable instream flows will be maintained. On the lowest flow day of the drought of record, a transfer of the maximum proposed amount (1.0 mgd) would only result in a 0.70% decrease in streamflow. Additionally, Andover's withdrawals are governed by the flow releases required under the Lawrence Hydroelectric Associates FERC license. This requires that 615 mgd (951 cfs) be released from the dam directly downstream of Andover's intake. The Town of Andover does not withdraw water from the Merrimack when it approaches this level.

When the basin plan for the Merrimack River basin is formulated, a reasonable instream flow threshold, which takes all water uses into account, will be developed. This will occur in 1995.

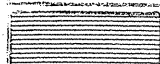
IPSWICH RIVER BASIN



Deficit Communities



No Excess Capacity



No Sources In-Basin



No Public Supply



